OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA GEN. REG. NO. 27

5010-107

UNITED STATES GOVERNMENT

Memorandum

[redacted]

TO : Chief, Saturn Systems Office, DG

DATE: January 5, 1967

FROM : Chief, Program Control Office, DC

SUBJECT: KSC Apollo Program Directive 4A

The enclosed is the revision of KSC Apollo Program Directive 4, which was issued July 15, 1966. This directive is based on MSF Apollo Program Directive 4F, dated November 30, 1966, as revised by TWX on December 23 and 27, 1966. The guidelines and milestones contained in the enclosed have been coordinated with representatives of DLO.

It is requested that the enclosed directive be officially transmitted to the Uprated Saturn I and Saturn V stage contractors, as a baseline for negotiating revisions to current contracts.

Bert Greenglass

Bert Greenglass

Enclosure:
KSC Apollo Program Directive 4A

[redacted]

Kennedy Space Center
APOLLO PROGRAM DIRECTIVE

Date:
December 27, 1966

KSC APOLLO PROGRAM DIRECTIVE NO. 4A

TO : Distribution

FROM
Apollo Program Manager

SUBJECT : KSC Apollo Program Schedules, Controlled Milestones and Hardware Assignments

ACTION : All KSC Organizations are to implement the requirements of this Directive effective with the issuance date and on a continuing basis

REFERENCE: A. Apollo Program Directive 4F

I. PURPOSE

This Directive defines the KSC Apollo/Saturn Program schedules that have been developed to meet the approved NASA Headquarters Apollo Program Schedules and Controlled Milestones. This revision supersedes KSC Apollo Program Directive No. 4 dated July 15, 1966.

II. SCOPE

Attachment A provides approved Apollo Program schedules, hardware and launch complex assignments and mission assignments. (Reference A).

Attachment B provides the KSC controlled schedule milestones in support of approved NASA Headquarters Apollo Program milestones. KSC controlled schedule milestones represent those significant events which must be accomplished in order to meet approved Program objectives.

Changes to Attachment B for Site Activation will require prior approval of the Apollo Program Manager. Changes to Launch Operations controlled schedules will require prior approval of the Director, Launch Operations and the Apollo Program Manager.

III. RESPONSIBILITIES

Each KSC organization is responsible for the immediate implementation of the requirements of this directive and for requesting changes to the controlled milestones under their management system.

Mission Support and Operations Planning

The flight hardware assignments and associated flight schedules shown in this attachment form the basis for mission support and operations planning through the Apollo Program including the overlap period between the Uprated Saturn I and the Saturn V flight schedules. In all cases, Launch Vehicle contractors and Spacecraft contractors will develop and maintain the capability to checkout and launch in accordance with schedules as shown in Attachment B.

These assignments are consistent with and are based on the approved general mission planning discussed below. The mission planning recognizes the fact that, during the CY-1967-1968 schedule overlap of AS-207 and AS-209 through AS-212 with AS-504 through AS-507, not all missions will be manned Apollo Missions flown on the presently approved Apollo Launch Schedule, but that one of the conditions described below will occur:

1. Spacecraft test flights on the Uprated Saturn I in support of the Lunar Landing Program will be transferred to the Saturn V as soon as that launch vehicle is capable of being manned (AS-503). It is planned that this transfer will occur after the dual mission of AS-205 and AS-208. This would release AS-207 and AS-209 through AS-212 from their primary Apollo Program assignment of a "CSM-LM Operations" mission. In this event it is planned that AS-207 and AS-209 through AS-212 would be flown as a follow-on mission. This phasing will be adjusted to result in no more than four LM flights and no more than six manned flights during CY-1968.

2. In the event that transfer of the spacecraft test flights from the Uprated Saturn I Program is delayed because manned Saturn V missions cannot be flown as early as planned (AS-503) during this overlap period, "CSM-LM Operations" missions would be flown on AS-207/AS-209, AS-210/AS-211 and AS-212, if required. The total missions in this case will also be scheduled to result in no more than four LM flights and no more than six manned flights during CY-1968.

3. In the event that AS-207/209 is a manned flight for the mainline Apollo Program, AS-503 would be an unmanned flight if flown on the present schedule. Also, if AS-210/211 is a manned flight in the mainline Apollo Program, AS-504 would be an unmanned flight if flown on the present schedule.

HARDWARE AND LAUNCH COMPLEX ASSIGNMENT SUMMARY UPRATED SATURN I

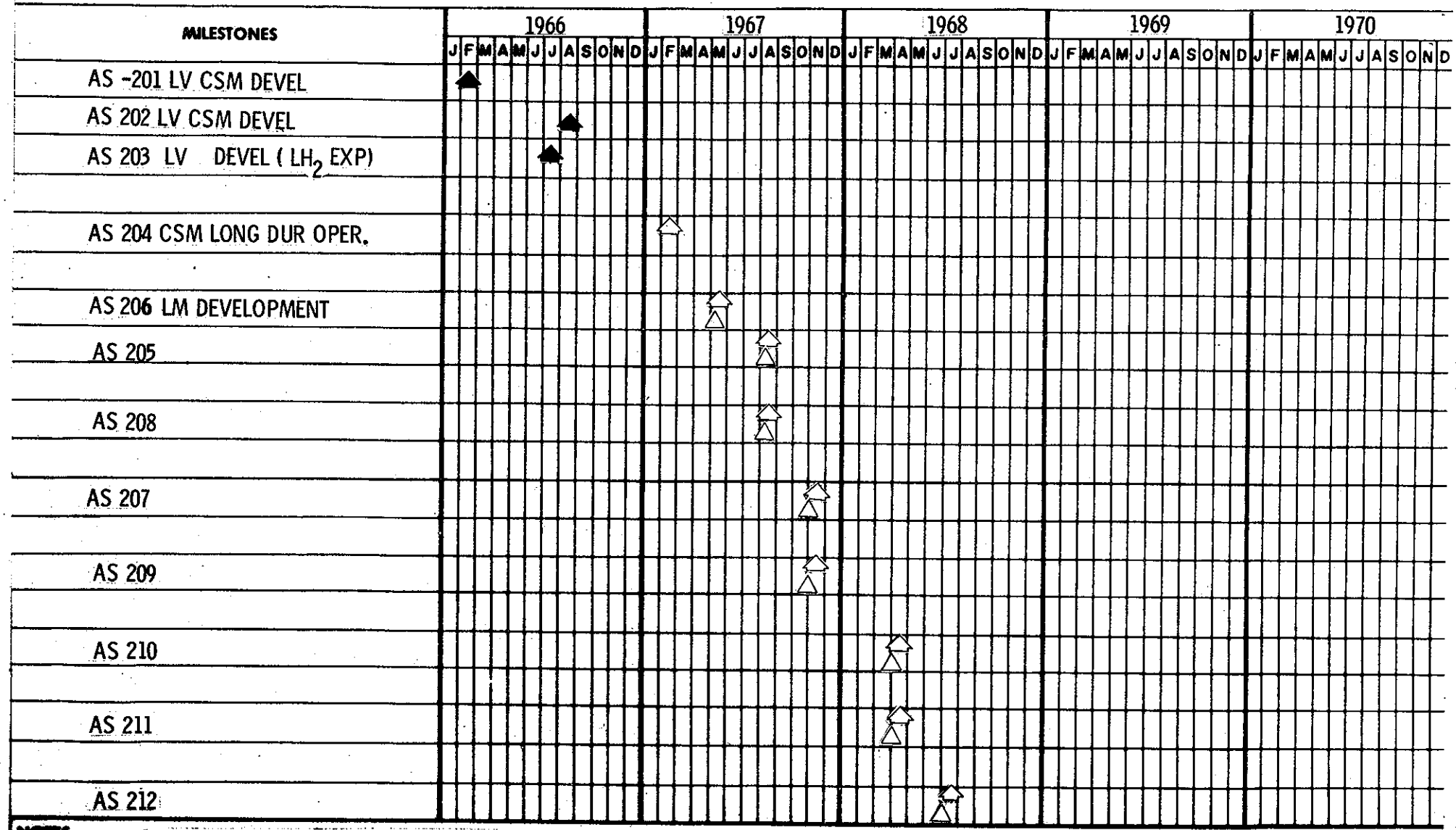
LV	CSM	LM	LAUNCH COMPLEX
201	009	None	34
202	011	None	34
203	NC-203	None	37B
204	012	None	34
206	NC-1	1	37B
205	101	None	34
208	NC-2	2	37B
207*	Yes	None	34
209*	Nosecone	Yes	37B
210*	Nosecone	Yes	37B
211*	Yes	None	34
212*	Yes	Yes	37B

*No Spacecraft assignments have been made due to the number of assignment alternatives which exist based on mission progress. Assumption is made that a spacecraft will be available to support the mission.

[redacted]

UPRATED SATURN I

MASTER LAUNCH SCHEDUE SCHEDULE



NOTES

△ OFFICIAL NASA LAUNCH SCHEDULE

△ KSC TARGET LAUNCH SCHEDULE

attachment A

[redacted]

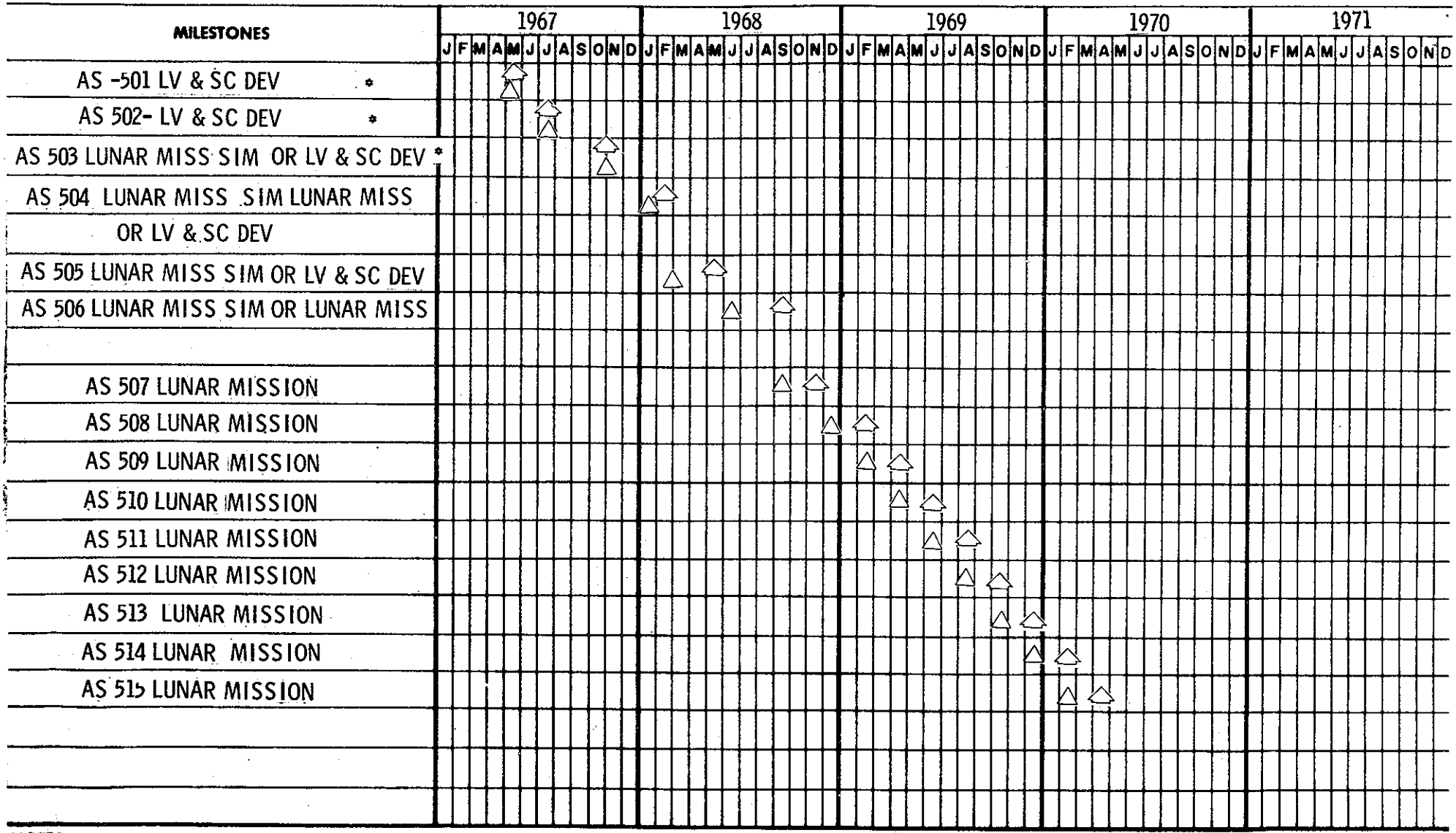
HARDWARE AND LAUNCH COMPLEX ASSIGNMENT
SUMMARY
SATURN V

LAUNCH VEHICLE	CSM	LEM	LAUNCH COMPLEX
501	017	LTA 10R	39A
502	020	LTA 2	39A
503	102	3	39A
504	103	4	39A
505	Yes	Yes	39B
506	Yes	Yes	39A
507*	Yes	Yes	39B
508*	Yes	Yes	39A
509*	Yes	Yes	39B
510*	Yes	Yes	39A
511*	Yes	Yes	39B
512*	Yes	Yes	39A
513*	Yes	Yes	39B
514*	Yes	Yes	39A
515*	Yes	Yes	39B

*No Spacecraft assignments have been made due to number of assignment alternatives which exist based on mission progress. Assumption is made that Spacecraft will be available to support the mission.

APOLLO SATURN V

MASTER LAUNCH SCHEDULE



NOTES

△ OFFICIAL NASA LAUNCH SCHEDULE

△ KSC TARGET LAUNCH SCHEDULE

attachment A

APOLLO UPRATED SATURN-1 WORK WEEK AND SHIFTS PLANNING

WORK WEEK PLANNING

AS-204 operations from spacecraft electrical mate through launch will be planned on a six (6) day work week.

AS-204 operations from start of stage checkout through spacecraft electrical mate will be planned on a five (5) day work week with limited overtime.

AS-205 through AS-212 operations from start of stage checkout through launch will be planned on a five (5) day work week with limited overtime. However, scheduling constraints may necessitate rescheduling and/or re-running major tests on the weekend.

Activation and launch operations activities will be planned on a five (5) day work week. Activation and launch operations activities critical to achieving schedule objectives, that can be accomplished by a small crew, in comparison to the contractor's total activation/launch crew, will be planned on an around-the-clock basis including weekends as required. Examples of such type activities are:

a. Vehicle Erection
b. Stage Propulsion Checks
c. Hypergolic Tanking
d. Ordnance Installations
e. Certain Refurbishments
f. RP-1 Tanking
g. GSE Modifications
h. Any individual stage contractor work prior to launch vehicle electrical mate

Operational planning should be based on not scheduling integrated tests to be performed on two launch vehicles on the same day.

Dual missions (AS-205/208, AS-207/209, and AS-210/211) will be launched with a minimum launch interval (T-O——T-O) of not less than 20 hours.

WORK SHIFTS PLANNING

Major tests will be conducted on first shift. (A work shift is to be considered as eight (8) working hours). Examples of major tests are: Plugs In Test, Plugs Out Test, Simulated Flight Test, Countdown Demonstration Test, Flight Readiness Test.

Specifically, a major test may be defined as a test involving at least two or more stages and multiple systems. Overrun of major test into the next shift will be accomplished by overtime for key test personnel with remaining support being provided by normal second shift personnel. Key test personnel are defined as those required to maintain test continuity. Major tests will not normally be conducted on weekends, however, a real time scheduling constraints may necessitate rescheduling and/or re-running a major test on the weekend.

Minor tests, test set-ups, maintenance and test evaluation will normally be planned for second shift. Specifically, a minor test may be defined as independent stage checks and other tests that may involve two or more stage contractors but are limited to small portions of the stage contractors test crew.

Third shift work will normally be limited to power off modifications minor trouble-shooting and maintenance.

UPRATED SATURN I ACTIVATION MILESTONES

LC-34 BLOCK II CSM CAPABILITY

Immediately following AS-204 launch, LC-34 will be modified to a Block II CSM configuration in preparation for the AS-205/AS 208 dual mission. To support this modification, Block II CSM ground support equipment (GSE) deliveries to KSC must be complete by February 1, 1967. The required Block II modifications will be accomplished during the time period of March 1, 1967 through May 1, 1967.

LC-37 BLOCK II CSM CAPABILITY

LC-37 is to be modified for Block II CSM capability by February 15, 1968. In order to support this plan, it is required that all ICD's be signed off by January 15, 1967; design must be completed by January 31, 1967; advance procurement must be initiated by March 1, 1967; and contractual award for construction modifications are to be completed by March 15, 1967. Construction should begin immediately following the launch of AS 208. The construction span time of 5-1/2 months will include one month of down time due to the final checkout and launch of AS 209. The subsequent completion of construction modifications is required by January 1, 1968, with a BOD of December 1, 1967. GSE must be delivered not later than October 1, 1967 in order to support a completion of installation and checkout by February 15, 1968. Included in this modification is the ability to support a simultaneous LM/CSM operations.

UPRATED SATURN I LAUNCH SCHEDULE

SPACE VEHICLE	STAGE	EARLIEST START DATE OF STAGE CHECKOUT OPNS	COMPLETE SPACE VEHICLE ELEC. MATE OR READY FOR FIRST INTEG. S/V TEST	CAPABILITY RANGE	LAUNCH DATE	CAPABILITY RANGE
204	S-IB*	Aug. 27, 1966	Jan. 27, 1966		Feb. 21, 1967	
	S-IVB	Aug. 19, 1966				
	IU	Aug. 24, 1966				
	CSM 012	Aug. 10, 1966		2 weeks later		2 weeks later
206	S-IB*	Jan. 19, 1967	Mar. 31, 1967	1 week earlier	May 2, 1967	1 week earlier
	S-IVB	Jan. 4, 1967				
	IU	Jan. 9, 1967				
	LM-1	Jan. 30, 1967		2 weeks later		2 weeks later
205	S-IB*	Mar. 8, 1967	Jul. 6, 1967	1 week earlier	Aug. 3, 1967	1 week earlier
	S-IVB	Mar. 1, 1967				
	IU	Mar. 3, 1967				
	CSM 101	Apr. 1, 1967		6 weeks later		6 weeks later
208	S-IB*	May 8, 1967	July 7, 1967	1 week earlier	Aug. 4, 1967	1 week earlier
	S-IVB	May 1, 1967				
	IU	May 3, 1967				
	LM-2	Apr. 15, 1967		6 weeks later		6 weeks later
207 **	S-IB*	Jul. 28, 1967	Oct. 2, 1967		Nov. 1, 1967	
	S-IVB	Jul. 28, 1967				
	IU	Jul. 28, 1967				
	CSM	Jul. 15, 1967		3 weeks later		3 weeks later

*Start of Uprated Saturn I Erection
**Will not be in parallel with AS-205 and AS-208

Attachment B

[redacted]

UPRATED SATURN I LAUNCH SCHEDULE

SPACE VEHICLE	STAGE	EARLIEST START DATE OF STAGE CHECKOUT OPNS	COMPLETE SPACE VEHICLE ELEC. MATE OR READY FOR FIRST INTEG. S/V TEST	CAPABILITY RANGE	LAUNCH DATE	CAPABILITY RANGE
209**	S-IB* S-IVB IU LM	Aug. 15, 1967 Aug. 8, 1967 Aug. 10, 1967 Jul. 15, 1967	Oct. 3, 1967	3 weeks later	Nov. 2, 1967	3 weeks later
210	S-IB* S-IVB IU LM	Jan. 2, 1968 Dec. 21, 1967 Dec. 28, 1967 Dec. 15, 1967	Mar. 2, 1968	4 weeks later	Apr. 4, 1968	4 weeks later
211	S-IB* S-IVB IU CSM	Jan. 15, 1967 Jan. 9, 1967 Jan. 11, 1967 Dec. 15, 1967	Mar. 1, 1968	4 weeks later	Apr. 3, 1968	4 weeks later
212	S-IB* S-IVB IU LM CSM	Apr. 15, 1968 Apr. 7, 1968 Apr. 11, 1968 Mar. 1. 1968 Mar. 1, 1968	May 28, 1968	4 weeks later	Jul. 3, 1968	4 weeks later

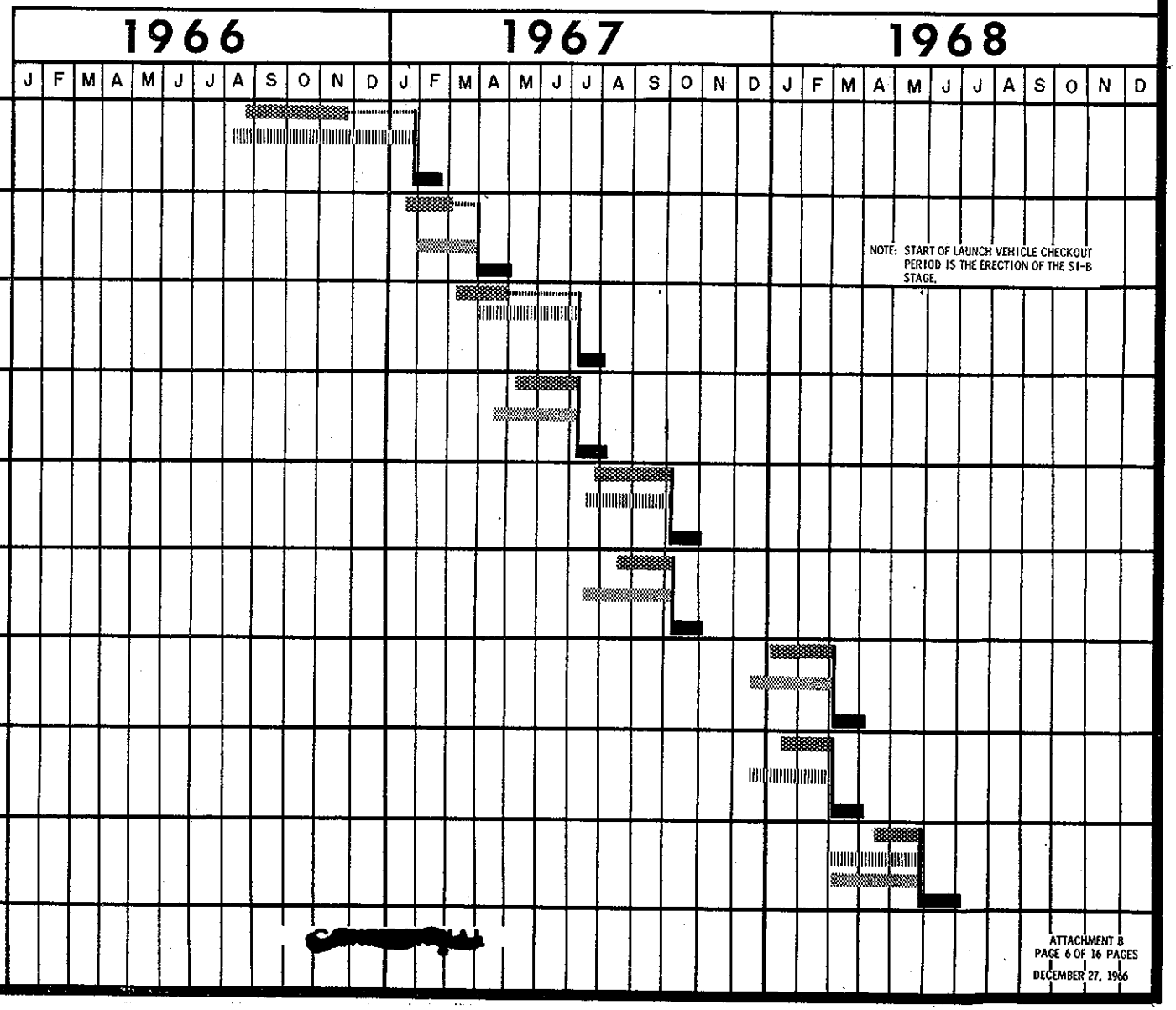
*Start of Uprated Saturn I Erection
**Will not be in parallel with AS-205 and AS-208

Attachment B

[redacted]

UPRATED SATURN I PROGRAM

LV CO
CSM CO
LM CO
SV CO
ELECT MATE



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APOLLO/SATURN V-WORK WEEK AND SHIFTS PLANNING

WORK WEEK PLANNING

Apollo/Saturn V activation and launch operations activities will be planned on a five (5) day work week. Activation and launch operations activities critical to achieving schedule objectives, that can be accomplished by a small crew, in comparison to the contractor's total activation/launch crew, will be planned on an around-the-clock basis including weekends as required. examples of such type activities are:

a. Vehicle Erection
b. Stage Propulsion Checks
c. Hypergolic Tanking
d. Ordnance Installations
e. Certain Refurbishments
f. RP-1 Tanking
g. GSE Modifications
h. Any individual stage contractor work prior to launch Vehicle Electrical Mate

Operational planning should be based on not scheduling integrated tests to be performed on two launch vehicles on the same day.

WORK SHIFTS PLANNING

Major tests will be conducted on first shift. (A work shift is to be considered as eight (8) working hours). Examples of major tests are: Plugs In Test, Plugs Out Test, Simulated Flight Test Countdown Demonstration Test, Flight Readiness Test.

Specifically, a major test may be defined as a test involving at least two or more stages and multiple systems. Overrun of major test into the next shift will be accomplished by overtime for key test personnel with remaining support being provided by normal second shift personnel. Key test personnel are defined as those required to maintain test continuity. Major tests will not normally be conducted on weekends, however, real time scheduling constraints may necessitate re-scheduling and/or re-running a major test on the weekend.

Minor tests, test set-ups, maintenance and test evaluation will normally be planned for second shift. Specifically, a minor test may be defined as independent stage checks and other tests that may involve two or more stage contractors but are limited to small portions of the stage contractors test crew.

Third shift work will normally be limited to power off modifications, minor trouble-shooting and maintenance.

SATURN V ACTIVATION MILESTONES

A.	LUT-3	
	1. LUT-3 operational ready for 500F-2	June 15, 1967 2 weeks later
	2. LUT-3 operational ready for Apollo/ Saturn V Flight Vehicle	April 1, 1968
B.	CSM/LM For AS-503	
	1. Complete CSM Block II GSE checkout and LM-3 GSE checkout on LUT-1 and VAB Hi-Bay #1 or #3	July 15, 1967 2 weeks later
	2. Complete CSM Block II GSE and LM-3 GSE checkout on MSS and Pad A	September 26, 1967 4 weeks later
C.	CSM/LM For 504	
	1. Complete CSM Block II GSE and LM-4 GSE checkout on LUT-2 and VAB Hi-Bay #1 or #3	October 1, 1967 4 weeks later
	2. Complete CSM/LM GSE checkout on Pad B for Back-up to AS 504	December 1, 1967 4 weeks later
D.	Complete all GSE/ESE installation and checkout in LCC Firing Room #3 to support operational space vehicle	April 15, 1968
E.	Complete all construction and outfitting and all GSE/ESE installation and checkout in VAB Hi-Bay #2 to support operational space vehicle	May 1, 1968

SPACECRAFT INDUSTRIAL AREA ACTIVATION MILESTONES

Industrial Area Facilities operational ready for LM-1-January 14, 1967

West Altitude Chamber operational ready for LM-2-April 15, 1967

[redacted]

SATURN V LAUNCH SCHEDULE

SPACE VEHICLE	STAGE	EARLIEST START DATE OF STAGE CHECKOUT OPNS	COMPLETE SPACE VEHICLE ELEC. MATE OR READY FOR FIRST INTEG. S/V TEST	CAPABILITY RANGE	LAUNCH DATE	CAPABILITY RANGE
501	S-IC	In Process	Mar. 8, 1967		May 5, 1967	
	S-II	Feb. 11, 1967				
	S-IVB	In Process				
	IU	In Process				
	CSM 017	Dec. 22, 1966		2 weeks later		3 weeks later
502	S-IC	Mar. 13, 1967	May 24, 1967		Jul. 21, 1967	
	S-II	Apr. 30, 1967				
	S-IVB	Feb. 24, 1967				
	IU	Feb. 24, 1967				
	CSM 020	Mar. 15, 1967		4 weeks later		4 weeks later
503	S-IC	Jun. 20, 1967	Sept. 1, 1967		Oct. 31, 1967	
	S-II	Aug. 8, 1967				
	S-IVB	Jun. 13, 1967				
	IU	Jun. 13, 1967				
	CSM 102	May 31, 1967				
	LM-3	Jun. 1, 1967		4 weeks later		4 weeks later
504*	S-IC	Sept. 1, 1967	Nov. 8, 1967		Jan. 5, 1968	
	S-II	Oct. 15, 1967				
	S-IVB	Sept. 1, 1967				
	IU	Sept. 1, 1967				
	CSM 103	Aug. 1, 1967				
	LM-4	Aug. 1, 1967		4 weeks later		4 weeks later

*Alternate mission planning for this launch calls for a lunar simulation like AS 503. In the event that AS 504 is designated a lunar simulation, launch will be January 5, 1968. Current flight hardware delivery schedule support this date. If the primary AS 504 mission is flown the launch date will remain February 1968.

[redacted]

SATURN V LAUNCH SCHEDULE

SPACE VEHICLE	STAGE	EARLIEST START DATE OF STAGE CHECKOUT OPNS	COMPLETE SPACE VEHICLE ELEC. MATE OR READY FOR FIRST INTEG. S/V TEST	CAPABILITY RANGE	LAUNCH DATE	CAPABILITY RANGE
505	S-IC	Dec. 5, 1967	Jan. 16, 1968		Mar. 1, 1968	
	S-II	Nov. 30, 1967				
	S-IVB	Nov. 28, 1967				
	IU	Dec. 6, 1967		4 weeks later		4 weeks later
	CSM	Sept. 30, 1967				
	LM	Nov. 1, 1967				
506	S-IC	Mar. 7, 1967	May 8, 1968	2 weeks earlier	Jun. 12, 1968	2 weeks earlier
	S-II	Feb. 27, 1967				
	S-IVB	Feb. 28, 1968				
	IU	Mar. 8, 1968		2 weeks later		2 weeks later
	CSM	Jan. 31, 1968				
	LM	Mar. 1, 1968				
507	S-IC	Jun. 6, 1968	Aug. 7, 1968	2 weeks earlier	Sept. 11, 1968	2 weeks earlier
	S-II	May 28, 1968				
	S-IVB	May 29, 1968				
	IU	Jun. 7, 1968		2 weeks later		2 weeks later
	CSM	Mar. 31, 1968				
	LM	May 1, 1968				
508	S-IC	Sept. 4, 1968	Nov. 5, 1968	2 weeks earlier	Dec. 11, 1968	2 weeks earlier
	S-II	Aug. 26, 1968				
	S-IVB	Aug. 28, 1968				
	IU	Sept. 5, 1968		2 weeks later		2 weeks later
	CSM	Jul. 31, 1968				
	LM	Sept. 1, 1968				

Attachment B

SATURN V LAUNCH SCHEDULE

SPACE VEHICLE	STAGE	EARLIEST START DATE OF STAGE CHECKOUT OPNS	COMPLETE SPACE VEHICLE ELEC. MATE OR READY FOR FIRST INTEG. S/V TEST	CAPABILITY RANGE	LAUNCH DATE	CAPABILITY RANGE
509	S-IC	Nov. 7, 1968	Jan. 8, 1969	2 weeks earlier	Feb. 12, 1969	2 weeks earlier
	S-II	Oct. 30, 1968				
	S-IVB	Nov. 1, 1968				
	IU	Nov. 8, 1968		2 weeks later		2 weeks later
	CSM	Sept. 30, 1968				
	LM	Nov. 1, 1968				
510	S-IC	Jan. 9, 1969	Mar. 12, 1969	2 weeks earlier	Apr. 16, 1969	2 weeks earlier
	S-II	Dec. 31, 1968				
	S-IVB	Dec. 31, 1968				
	IU	Jan. 10, 1969		2 weeks later		2 weeks later
	CSM	Nov. 31, 1968				
	LM	Jan. 1, 1969				
511	S-IC	Mar. 6, 1969	May 7, 1969	2 weeks earlier	Jun. 11, 1969	2 weeks earlier
	S-II	Feb. 25, 1969				
	S-IVB	Feb. 26, 1969				
	IU	Mar. 7, 1969		2 weeks later		2 weeks later
	CSM	Jan. 31, 1969				
	LM	Mar. 1, 1969				
512	S-IC	May 8, 1969	Jul. 9, 1969	2 weeks earlier	Aug. 13, 1969	2 weeks earlier
	S-II	Apr. 29, 1969				
	S-IVB	Apr. 30, 1969				
	IU	May 9, 1969		2 weeks later		2 weeks later
	CSM	Mar. 31, 1969				
	LM	May 1, 1969				

Attachment B

[redacted]

SATURN V LAUNCH SCHEDULE

SPACE VEHICLE	STAGE	EARLIEST START DATE OF STAGE CHECKOUT OPNS	COMPLETE SPACE VEHICLE ELEC. MATE OR READY FOR FIRST INTEG. S/V TEST	CAPABILITY RANGE	LAUNCH DATE	CAPABILITY RANGE
513	S-IC	Jul. 10, 1969	Sept. 10, 1969	2 weeks earlier	Oct. 15, 1969	2 weeks earlier
	S-II	Jul. 1, 1969				
	S-IVB	Jul. 2, 1969				
	IU	Jul. 11, 1969		2 weeks later		2 weeks later
	CSM	May 31, 1969				
	LM	Jul. 1, 1969				
514	S-IC	Sept. 10, 1969	Nov. 10, 1969	2 weeks earlier	Dec. 17, 1969	2 weeks earlier
	S-II	Aug. 29, 1969				
	S-IVB	Sept. 2, 1969				
	IU	Sept. 11, 1969		2 weeks later		2 weeks later
	CSM	Jul. 31, 1969				
	LM	Sept. 1, 1969				
515	S-IC	Nov. 7, 1969	Jan. 7, 1970	2 weeks earlier	Feb. 11, 1970	2 weeks earlier
	S-II	Oct. 28, 1969				
	S-IVB	Oct. 29, 1969				
	IU	Nov. 10, 1969		2 weeks later		2 weeks later
	CSM	Sept. 30, 1969				
	LM	Nov. 1, 1969				

Attachment B

[redacted]

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APOLLO SATURN V PROGRAM

LV CO
CSM CO
LM CO
SV CO
ELEC MATE

1967 | 1968 | 1969 | 1970

J F M A M J J A S O N D | J F M A M J J A S O N D | J F M A M J J A S O N D | J F M A M J

501	LAUNCH COMPLEX 39A	LV 501 CSM 017 LTA 10
502	LAUNCH COMPLEX 39A	LV 502 CSM 020 LTA 2
503	LAUNCH COMPLEX 39A	LV 503 CSM 102 LM 3
504	LAUNCH COMPLEX 39A	LV 504 CSM 103 LM 4
505	LAUNCH COMPLEX 39B	LV 505 CSM LM
506	LAUNCH COMPLEX 39A	LV 506 CSM LM
507	LAUNCH COMPLEX 39B	LV 507 CSM LM
508	LAUNCH COMPLEX 39A	LV 508 CSM LM
509	LAUNCH COMPLEX 39B	LV 509 CSM LM
510	LAUNCH COMPLEX 39A	LV 510 CSM LM
511	LAUNCH COMPLEX 39B	LV 511 CSM LM
512	LAUNCH COMPLEX 39A	LV 512 CSM LM
513	LAUNCH COMPLEX 39B	LV 513 CSM LM
514	LAUNCH COMPLEX 39A	LV 514 CSM LM
515	LAUNCH COMPLEX 39B	LV 515 CSM LM

NOTE: START OF LAUNCH VEHICLE PERIOD IS THE STAGE CHECKOUT OF THE S IV-B

[redacted]

ATTACHMENT B
PAGE 15 OF 16 PAGES

DECEMBER 27, 1966.

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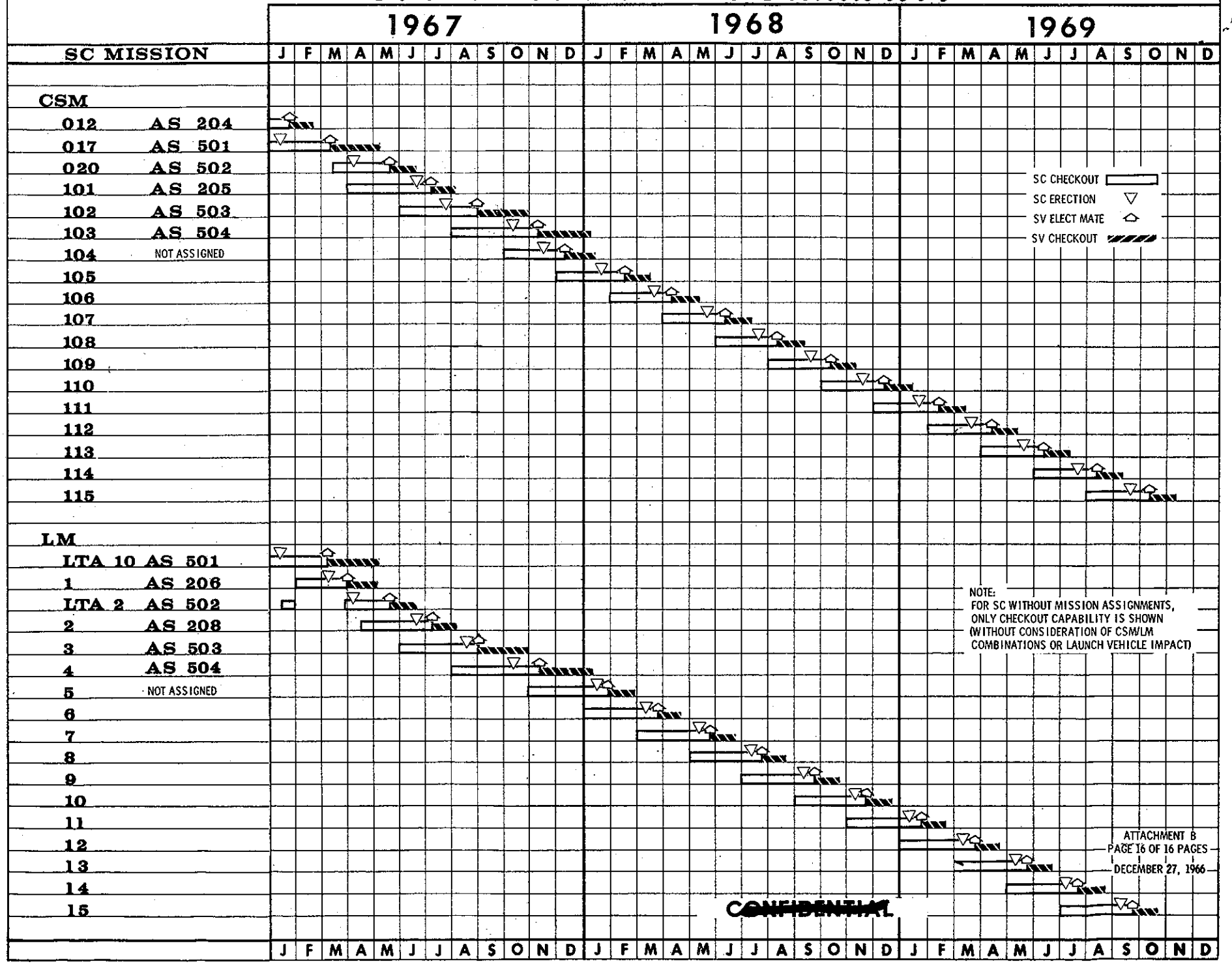
SPACECRAFT SUMMARY



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R.A. Gramer, RJ	1
S.E. Carlson, RK	1

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